

REMARKS

The Office Action dated September 3, 2009, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

By this Response, claim 65 has been amended, and claim 76 has been added, to more particularly point out and distinctly claim the subject matter of the present invention. No new matter has been added. Accordingly, claims 37-50, 52-60, 63-65, and 68-76 are pending in the application, of which claims 37, 65, 71, and 76 are independent claims. Applicant respectfully submits claims 37-50, 52-60, 63-65, and 68-76 for consideration.

In view of the above amendments and the following remarks, Applicant respectfully requests reconsideration and timely withdrawal of the pending rejections to the claims for the reasons discussed below.

Claim Rejection - 35 U.S.C. 112

Claims 37, 48-49, 55, 65, 71, and 73 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Applicant respectfully submits that this rejection is legally improper.

The Office Action asserted that a specific reference to the limitation “non-reflective actuator” of the present invention is absent from the specification, specifically, at page 3, lines 17-22, as cited in the previous Response. Applicant respectfully submits

that this rejection is improper because it rigidly analyzes the disclosure in view of the precise words “non-reflective actuator.” Instead, the appropriate analysis is whether the specification discloses the concept behind the words.

The Federal Circuit has held, “To fulfill the written description requirement, the patent specification must describe an invention in sufficient detail that one skilled in the art can clearly conclude that the inventor invented what is claimed” (*see Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352, 1364 (Fed. Cir. 2003)). The Federal Circuit has explained, however, “The disclosure as originally filed does not ... have to provide *in haec verba* support for the claimed subject matter at issue” (*see id.*). In other words, there is no requirement that the precise language used in the claims appear in the specification, in order to satisfy the written description requirement. The concept claimed is fully supported in the specification, in such a way that one of ordinary skill in the art could clearly conclude that the inventor invented what is claimed. Thus, the claims fully comply with the written description requirement.

The concept of a “non-reflective actuator” is described in the specification, for example, at page 3, lines 17-22, as cited in the previous Response. In this portion, the specification refers to an actuator being a silicone rubber actuator. One of ordinary skill in the art would recognize that silicone rubber is non-reflective of light. Thus, the specification provides full and adequate support for the claim recitations.

In addition, the specification states, “While previous optical solutions for analogue navigation [utilize] reflective techniques, embodiments of the present invention rely on

changing the refractive index of a light guide” (*see* Specification at page 3, lines 26-28). As such, it is implicit that the present invention does not use reflective techniques, and that the actuator of the present invention is non-reflective. This contrasts with actuators used in previous optical solutions that are reflective. Therefore, the specification makes it completely clear to one of ordinary skill in the art that the present invention utilizes a non-reflective actuator rather than a reflective actuator used in previous optical solutions, and provides full and adequate support for the claim recitations. Accordingly, Applicant respectfully submits that this rejection is clearly improper, and respectfully requests that this rejection be withdrawn.

Reconsideration and allowance of claims 37, 48-49, 55, 65, 71, and 73 are, thus, respectfully requested.

Claim Rejections - 35 U.S.C. 103

Claims 37-46, 48, 52-60, 63-65, and 68-75 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Nading (U.S. Patent No. 6,369,800) in view of Ely (U.S. Patent No. 4,480,182). The Office Action took the position that the combination of Nading and Ely discloses or suggests all of the features of these claims. Applicant respectfully submits that each of these claims recites subject matter that is neither disclosed nor suggested in the combination of Nading and Ely.

Independent claim 37, upon which claims 38-50, 52-60, 63-64, and 68-70 depend, is directed to an apparatus including a light guide having a surface to internally reflect a

generated light signal from a transmitter to a receiver. The apparatus also includes an actuator having a non-reflective actuator surface, non-reflective actuator surface having at least a portion which is movable between a first position spaced apart from a portion of the light guide surface, with a gas or fluid therebetween, and a second position which is in contact with the portion of the light guide surface. The portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface, and the portion of the non-reflective actuator surface has a different refractive index than the gas or fluid. In use the relative refractive index is changed at a contacted portion of the light guide surface, thereby altering the light signal received by the receiver, and the portion of the non-reflective actuator surface is deformable.

Independent claim 65, upon which claims 72-75 depend, is directed to a method including reflecting a generated light signal off a surface. A relative refractive index between materials on either side of the surface is changed by contacting the surface with a non-reflective deformable actuator, which has a lower refractive index than the surface, thereby altering the reflected light signal. The reflected light signal is received and used to control a position of an element.

Independent claim 71 is directed to an apparatus including light guiding means for guiding light, the light guiding means having a surface for internally reflecting a generated light signal from transmitting means to receiving means. The apparatus also includes actuating means for actuating, the actuator means having a non-reflective deformable surface with at least a portion of which is movable between a first position

spaced apart from a portion of a light guide surface, with a gas or fluid therebetween, and a second position in contact with the portion of the light guide surface. The portion of the light guide surface has a higher refractive index than the portion of the non-reflective deformable actuator surface, and the portion of the non-reflective deformable actuator surface has a different refractive index than the gas or fluid. In use the relative refractive index is changed at the contacted portion of the light guide surface, thereby altering the light signal received by the receiving means.

Applicant respectfully submits that the combination of Nading and Ely fails to disclose or suggest all of the features of any of the presently pending claims.

Nading describes a method and an apparatus for use with a keypad for an electronic device including at least one plunger associated with a key. The plunger is moveable between a first position and a second position relative to the electronic device. The apparatus is an electrical assembly including a light guide, and at least one electrical component carried by the light guide and positioned to underlie the key. Positioning to underlie the key is for at least one of a) illuminating the key, and b) changing between a first electrical state and a second electrical state in response to the plunger being moved between the first and second positions to indicate that the key has been operated by the user (*see* Nading at Abstract).

Ely describes a photo-optical switch apparatus including a photopolymerized matrix of horizontal and vertical intersecting light channels or guides, monolithically formed by exposure to ultraviolet light on a flat planar, plastic substrate. Each

intersection has a refractive index higher than either the channel or the adjacent substrate area. A light absorbing key pad is arranged adjacent to each intersection to couple light from the channel up into the key pad. A relative loss of light indicates the key being depressed (*see* Ely at Abstract).

Applicant respectfully submits that the combination of Nading and Ely fails to disclose or suggest all of the features of any of the presently pending claims. Specifically, the combination of Nading and Ely does not disclose or suggest, at least, “wherein the portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface,” as recited in independent claim 37 and similarly recited in the other independent claims. The Office Action acknowledged that the combination of Nading and Ely fails to disclose or suggest these features (*see* Office Action at page 5, third paragraph). The Office Action then asserted that it would have been an obvious matter of design choice to a person of ordinary skill in the art to make these features because Applicant has not disclosed that these features provide an advantage, are used for a particular purpose, or solve a stated problem (*see* Office Action at page 5, last paragraph). The Office Action further alleged that one of ordinary skill in the art would have expected Applicant’s invention to perform equally well regardless of the relative reflectivity of an absorbing plastic sheet and a light guide since a system will still detect the presence of the sheet even if the sheet is not as reflective as the guide as disclosed in Ely at column 4, lines 25-56 (*see* Office Action at page 5, last paragraph, to page 6, first paragraph). The Office Action concluded that it would have been an obvious

matter of design choice to modify the combination of Nading and Ely to obtain the present invention (*see* Office Action at page 6, second paragraph).

Contrary to the assertions of the Office Action, it would not have been an obvious matter of design choice to modify the combination of Nading and Ely to obtain the features “wherein the portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface,” as recited in independent claim 37 and similarly recited in the other independent claims. This is because one of ordinary skill in the art would not be motivated to modify Ely to obtain such features, as Ely teaches away from the present invention. Under MPEP 2145(X)(D), a prior art reference that “teaches away” from the claimed invention is a significant factor to be considered in determining obviousness. Here, as shown in Figure 6, Ely describes a light absorbing plastic sheet 52 (*e.g.*, an actuator) with an index of refraction equal to or greater than that of a light conducting channel 50 (*e.g.*, a light guide) (*see* Ely at column 4, lines 45-49). Light 54, from a light source 56, would otherwise be totally internally reflected within the channel 50 (*see* Ely at column 4, lines 49-51). When the sheet 52 contacts the channel 50, the light 54 is coupled out of the channel 50 and up into the sheet 52 to be totally or substantially totally absorbed, thus, producing a switch device that is either on or off and provides no intermediate values of light (*see* Ely at column 4, lines 51-56).

In contrast, the present invention describes the complete opposite of Ely, the present invention referring to a light guide surface having a higher refractive index than a contacted portion of a non-reflective actuator surface. As such, in the present invention,

internal reflection still occurs within the light guide when the actuator surface contacts the light guide surface (*see, e.g.,* Specification at Figure 3). In addition, since the refractive index of the actuator surface is different than the refractive index of a gas or a fluid between the light guide and the actuator, the amount of light internally reflected will change in a variable manner and provide a range of values of light (*see, e.g.,* independent claim 37). This clearly contrasts with the sheet and the channel of Ely that produce only a switch device that is either on or off and provides no range of values of light (*see* Ely at column 4, lines 51-56). Accordingly, Ely teaches away from the present invention, and would not be modified to obtain the features the features “wherein the portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface,” as recited in independent claim 37 and similarly recited in the other independent claims.

Furthermore, it would not have been an obvious matter of design choice to modify the combination of Nading and Ely to obtain these features of the present invention since this modification would render Ely being modified unsatisfactory for its intended purpose. Under MPEP 2143.01(V), if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In this case, as discussed above, the intended purpose of Ely is to totally or substantially totally absorb light when the sheet contacts the channel, thus, producing the switch device (*see* Ely at column 4, lines 51-56). This is accomplished by the actuator with an index of refraction equal to or

greater than the light guide (*see* Ely at column 4, lines 45-49). However, if Ely is modified to include the actuator having a lesser refractive index than the light guide, as claimed in the present invention, then light would be totally internally reflected within the channel (*see* Ely at column 4, lines 49-51). This would render the system of Ely unsatisfactory for its intended purpose of producing the switch device. Accordingly, Ely would not be modified to obtain the features the features “wherein the portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface,” as recited in independent claim 37 and similarly recited in the other independent claims.

Furthermore, contrary to the assertions of the Office Action, Applicant has disclosed that these features provide an advantage or are used for a particular purpose. As mentioned above, the present invention includes the advantage of being able to change the amount of light internally reflected in a variable manner and to provide a range of values of light (*see, e.g.,* independent claim 37). This advantage cannot be achieved with the sheet and the channel of Ely that produce only a switch device that is either on or off and provides no range of values of light (*see* Ely at column 4, lines 51-56). Accordingly, it would not have been an obvious matter of design choice to modify the combination of Nading and Ely to obtain the features “wherein the portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface,” as recited in independent claim 37 and similarly recited in the other independent claims.

For at least the reasons discussed above, Applicant respectfully submits that the combination of Nading and Ely fails to disclose or suggest all of the elements of independent claims 37, 65, and 71. Accordingly, Applicant respectfully requests that the rejection of independent claims 37, 65, and 71 be withdrawn.

Claims 38-46, 48, 52-60, 63-64, 68-70, and 72-75 depend from, and further limit, independent claims 37 and 65. Thus, claims 38-46, 48, 52-60, 63-64, 68-70, and 72-75 recites subject matter that is neither disclosed nor suggested in the combination of Nading and Ely. Accordingly, Applicant respectfully requests that the rejection of claims 38-46, 48, 52-60, 63-64, 68-70, and 72-75 be withdrawn.

Claim 47 was rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Nading and Ely in view of Ochiai (U.S. Patent No. 6,196,691). The Office Action took the position that the combination of Nading and Ely discloses or suggests all of the features of this claim, except for a light guide that includes an optical grating. The Office Action then cited Ochiai to cure the deficiencies of the combination of Nading and Ely. Applicant respectfully submits that this claim recites subject matter that is neither disclosed nor suggested in the combination of Nading, Ely, and Ochiai.

Nading and Ely are outlined above. Ochiai describes rays of light from three light-emitting diodes incident at a thicker side end edge of a light guide plate made of a transparent plate. A ratio of grating part width/non-grating part width in a unit width of a diffraction grating provided on a rear surface of the light guide plate is varied. Grating constant of a diffraction grating of a front surface provided perpendicularly to the

diffraction grating, is set to a fixed value smaller than a mean grating constant of the diffraction grating of the rear surface (*see* Ochiai at Abstract).

Applicant respectfully submits that claim 47 recites subject matter that is neither disclosed nor suggested in the combination of Nading, Ely, and Ochiai. Claim 47 depends from, and further limits, claim 37. As discussed above, the combination of Nading and Ely fails to disclose or suggest all of the features of claim 37. In addition, Ochiai does not cure the deficiencies of the combination of Nading and Ely, as Ochiai fails to disclose or suggest, at least, “wherein the portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface,” as recited in claim 37. Accordingly, Applicant respectfully submits that the combination of Nading, Ely, and Ochiai does not disclose or suggest all of the features of claim 47.

Claims 49-50 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Nading and Ely in view of Wingett (U.S. Patent Appln. Pub. No. 2002/0061735). The Office Action took the position that the combination of Nading, Ely, and Wingett discloses or suggests all of the features of these claims. Applicant respectfully submits that each of these claims recites subject matter that is neither disclosed nor suggested in the combination of Nading, Ely, and Wingett.

Nading and Ely are outlined above. Wingett describes a control device for an electronic apparatus, such as a mobile telephone handset, including a keymat having a navigation key with a magnet mounted so as to move with the key. A user may change the attitude of the key by tilting or deforming the key, and at least one magnetic field

sensor detects the attitude of the key. This may be used to control a pointer displayed on a screen (*see* Wingett at Abstract).

Applicant respectfully submits that claims 49-50 recites subject matter that is neither disclosed nor suggested in the combination of Nading, Ely, and Wingett. Claims 49-50 depend from, and further limit, claim 37. As discussed above, the combination of Nading and Ely fails to disclose or suggest all of the features of claim 37. In addition, Wingett does not cure the deficiencies of the combination of Nading and Ely, as Wingett fails to disclose or suggest, at least, “wherein the portion of the light guide surface has a higher refractive index than the portion of the non-reflective actuator surface,” as recited in claim 37. Accordingly, Applicant respectfully submits that the combination of Nading, Ely, and Wingett does not disclose or suggest all of the features of claims 49-50.

Reconsideration and allowance of claims 37-50, 52-60, 63-65, and 68-75 are, thus, respectfully requested.

Conclusion

For at least the reasons discussed above, Applicant respectfully submits that the cited references fail to disclose or suggest all of the features of the present invention. These distinctions are more than sufficient to render the present invention unobvious. It is thus respectfully requested that all of claims 37-50, 52-60, 63-65, and 68-76 be allowed, and that this application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, Applicant's undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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